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Appendix

Study Cores: Institution (Core Director)

Data Coordination Center and Surgical Core: Baylor College of Medicine (J. S. Coselli, Study Principal Investigator)

Marfan Diagnostic Core: Johns Hopkins Hospital (H. C. Dietz)

Imaging Core: Mayo Clinic, Rochester (H. M. Connolly)

Genetic Repository: University of Texas Medical School at Houston (D. M. Milewicz)

Participating Study Sites: Institution (Site Principal Investigator, Number of Patients Enrolled)

Argentina: Institute of Cardiology and Cardiovascular Surgery—Favaloro Foundation (R. R. Favaloro, 10 patients).

Canada: University of Ottawa Heart Institute (K-L. Chan, 1 patient).

Germany: Hannover Medical School (A. Haverich, 5 patients); University Clinic of Schleswig-Holstein (H. H. Sievers, 6 patients); University of Leipzig (F. W. Mohr, 14 patients).

Netherlands: Leiden University Medical Center (M. I. M. Versteegh, 1 patient).

USA: Baylor College of Medicine (J. S. Coselli, 8 patients); Central Maine Heart and Vascular Institute (R. P. Cochran, C. Frumiento, 1 patient); Johns Hopkins Hospital (V. L. Gott, L. A. Vricella, 16 patients); Loyola University Medical Center (J. P. Schwartz, 3 patients); Mayo Clinic, Rochester (T. M. Sundt III, 21 patients); Missouri Baptist Medical Center (N. T. Kouchoukos, 5 patients); Montefiore Medical Center (A. DeAnda, 2 patients); New York Presbyterian–Cornell Hospital (L. N. Girardi, 7 patients); Northwestern University Feinberg School of Medicine (T. G. Gleason, C. Malaisrie, 2 patients); Stanford University (D. C. Miller, 19 patients); University of Pennsylvania (J. E. Bavaria, 19 patients); Washington University (M. R. Moon, 11 patients).

Discussion

Dr Alan D. Hilgenberg *(Boston, Mass).* Dr Coselli, congratulations to you and your colleagues for designing and implementing this very important study. The presentation is a report of the current practice of aortic root repair in patients with MFS from centers in Europe and North and South America. First of all, it is remarkable that there was no 30–day mortality in 151 patients, attesting to the safety of these complex surgical procedures. Seventy percent of the operations were valve-sparing, all but two of them were of the reimplantation type, and about two thirds included repair with sinuses.

The patients undergoing AVR were different from those undergoing AVS in several important characteristics. They were older, they had more preoperative aortic regurgitation, and they underwent more nonelective operations. These factors probably will affect the long–term results in addition to the presence of a mechanical valve when comparisons with the outcomes of AVS patients are made.

The most important information from this study will come from the years of follow-up data that we hope you will accumulate. The late results of composite valve graft replacement in patients with MFS have been reported at least a couple of times in the last several years. Survival at 10 years of 75% was reported by Gott in the *New England Journal of Medicine* study in 1999. More recent data from Hopkins presented at the Society of Thoracic Surgeons meeting in 2008 by Cameron had an 85% survival at 10 years. Although these results are good, I suspect that the late results in terms of survival and freedom from thromboembolism in the AVS group will be even better in this study. However, how durable will the AVS operations be in terms of avoiding late operation for aortic regurgitation? David and Feindel reported freedom from moderate or severe aortic insufficiency in reimplantation procedures to be 94% at 10 years, and in their studies, MFS was not a risk factor for late aortic insufficiency. This study should be able to show whether other surgeons throughout the world can achieve similar results. I hope that you will keep gathering this important follow-up data.

I have a couple of questions. Have the participating centers agreed to include their entire experience with consecutive MFS patients, and if not, do you think this will make a difference in the outcomes?

Dr Coselli. They have agreed, and I do believe that not enrolling consecutive patients would affect the results. The intent has been that once investigators agreed to participate in the study, they would recruit and screen consecutive patients. I believe that, so far, compliance has been very good and consecutive patients have been screened.

Dr Hilgenberg. I think that would be important. I am assuming that AVS repair is the preferred operation in all of the centers. What are the common reasons that valves were replaced, if you know, and were there situations in which valves might have been spared if the patient had been referred earlier for surgery?

Dr Coselli. Those are good questions. In 43% of the patients, the decision as to which operation to perform was ultimately made at the time of surgery; the decision to replace the valve was made by the surgeon, and it primarily revolved around anatomic features that the surgeons, who are all well-versed in valve-sparing techniques, believed would compromise the durability of a valve-sparing repair.

There were also some patients whose primary concern was that they did not want to have a second procedure and did not want to subject themselves to the risks of the potential lack of durability of the procedure; these patient selected having a mechanical valve at the outset.

Dr Hilgenberg. David and Feindel perform cusp repair frequently in these operations, and I think it would be of interest to the audience to know whether cusp repair was used often or rarely in this series of patients.

Dr Coselli. In this series of patients, relatively rarely; only 17% of the patients had cusp repair.

Dr Hilgenberg. One final comment: I am sitting here with my colleague, Cary Akins, who formulates the reporting of valve-related complications, and I think the re–exploration for bleeding in this series really does not belong in the valve-related complications. That is a surgical complication, not necessarily valve-related, I believe.

Dr Tirone E. David *(Toronto, Ontario, Canada).* I am sorry that I am not participating in this study. I think it is important to have information regarding the aortic cusps in this database. In my experience with AVS procedures during the past 19 years, what determines whether a valve can be spared or not is the quality of the aortic cusps. In at least half of my patients with MFS, I had to repair the cusps to spare the valve. In other words, these patients had premature cusp degeneration just as in mitral valve prolapse. Unless you do something with the cusps, I am surprised that you ended up with no aortic insufficiency. Do you have data on how many cusps were abnormal?

Dr Coselli. In the way you describe it, no.

Dr David. I propose that you add this to the database. We find it the single most important determinant of feasibility of repairing these valves. Cusps with large stress fenestrations, overstretched and thinned out, should not be preserved and AVR probably results in better outcomes.

Dr Coselli. Dr David, thank you for your comments and thank you for your immense contribution and pioneering work in this area. All of the centers that participated involved surgeons who are well-versed in the techniques and carry on a practice that allows them to very reliably carry out AVS procedures; I believe that the results, with no deaths, no strokes, and no moderate or severe aortic valve regurgitation in the early postoperative period, confirm their levels of expertise. I think it would be challenging for this type of registry—which already collects an immense amount of data from very diverse institutions across the globe—to accumulate the kind of detailed information on the leaflets that a single surgeon and a single center can. But I appreciate the insight, and ideally we can incorporate that.